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DRAFT
14 February 1967

MAGNETIC TAPE TO PHOTO REPRODUCER

1. PROBLEM:

To provide NPIC with the capability to exploit and extract selected high quality photographs from video tape inputs supplied by the acquisition community.

2. FACTS BEARING ON THE PROBLEM:

a. Collection programs now being initiated ~~will~~ greatly increase the volume of video tape information available for analysis.

b. Although most video tapes supplied to the collection community can be viewed at some installation, there are no facilities available where tapes can be studied by Center personnel. The Center should have this in-house capability.

c. There are presently no methods of obtaining high quality photo copy or to view selected frames of imagery for study.

d. Except for brightness and contrast controls, there are no electronic methods for enhancement or improving highlight or shadow information.

3. DISCUSSIONS:

a. Current Procedure. Currently when video tapes of intelligence importance are received, analysts are required to travel either to Langley or the Pentagon to view them. Transportation problems for a number of personnel and the need to "study" the taped information (as compared with just "viewing" the taped information) places a burden on both the facility

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and personnel. Of the four government agencies which have the facilities for viewing video tape (CIA/Graphic Register, Naval Photographic Center, NSA, and Army Signal Corps) none have the capability of viewing in slow motion and/or stop motion or of extracting high quality still photographs. It is fully expected that the Center's facilities will be available to the Intellignece Community to fill the specialized needs of the community.

Present photographich hard copy production methods are either (a) Video tape--to 16mm film--to still copy, or (b) uncontrolled direct photography of the video monitor.

The 16mm Kinescope photography obtained from original video tape information is of such poor quality that it is practically useless for detailed analysis. First of all, the technique of Kinescope photography "throws away" information in the conversion from a 30 frame per sec. system to a 24 frame per sec. mothion picture display. Secondly, there is considerable loss of information from regeneration from one step toanother, particularly if a scan conversion is accomplished, i.e, 625/50 field to 525/60 field. The system is greatly compromized for the purpose of frame comparison study--particularly if there is much motion in the frame. Photographing a video screen produces a very poor copy due to CRT curvature and imperfections. It is also opportunistic and non-selective by its nature. An optimum system would allow the interpreter to select the best frame or best field, (in the event of considerable motion) for evaluation.

b. Origin of Concept. Sparked by the 1 May and 7 November 1965 Moscow parades broadcast on TV and the appearance of other intelligence information on foreign TV programs, CSD requested an investigation, study, and recommendation of TV magnetic tape systems with a quality hard copy capability for the purpose of exploiting this new source of information.

The requirements as set forth by CSD to achieve NPIC interpretation needs are as follows:

1. Equipment to view and to study slow motion and stop motion video taped information at the Center.

2. Ability to electronically enhance the CRT presentation in order to optimize the pictoral presentation of the particular area of investigation.

3. Ability to extract high quality selected still photographs from the video tape.

c. Proposed Program. The proposed development provides for the design of an electro-optical system for viewing and studying intelligence information in the form of magnetic video tape and for the selection and transfer of this information to a quality photographic record. Incorporated in the system are additional PI aids for image enhancement, black and white stretch, spot wobble, etc.

The proposed program also provides for the operation, maintenance and training services of a field engineer for the period of one year. However, it would also be possible to contract for a less expensive "on call" operation and maintenance services on the basis that the delay of a few hours would not be considered detremental. It is expected that the Center will provide personnel to be trained to take over these duties. If qualified competent Center personnel are not available at the end of this year's time, additional contract personnel can be provided for as long as is necessary.

d. Selection of Contractor. Request for proposals were sent to eleven representative video-electronic firms. Seven "no bids" were received. Proposals were received from [redacted] Evaluation of 25X1

the proposals was performed by a committee from CSD and cognizant technical personnel from the Technical Development Staff. The results of the evaluation are generally as follows:

[redacted] 25X1 Despite the fact that "Horizontal Apperture Equalization" was omitted, the proposal was a very good one and was responsive to the RFP. The price of over half a million dollars is considered prohibitive, particularly since a less expensive proposal was received which contains all the requirements set forth in the Development Objectives.

[redacted] 25X1 - This proposal is considered non-responsive to the Development Objective. The [redacted] 25X1 [redacted] 25X1 proposes making photo hard copy directly from a narrow band width VOR-250 disc reocrder.

[redacted] 25X1 - This proposal describes the use of a wide band width recorder not yet in existnace. There is an unnecessary high risk in this approach. Far better quality can be obtained directly from the video tape.

[redacted] 25X1 - This firm proposes the production of hard copy directly from the video tpae through the electronics. The stop motion disc is to be used only for the selection and study of the particular frame or field and for adjustment of the controls. This proposal is considered the best received and is completely responsive to the Development Objective.

f. Alternatives. Without the proposed system for extracting quality photo hard copy from video tapes supplied by the collection community, the only other form of photographic material available is a highly compromized, poor quality 16mm Kine film recording.

4. CONCLUSIONS:

In response to the RFP for a "Magnetic Taype to Photo Reproducer" the [redacted] proposal is the bes received. It is considered that the proposal will fill the Center's requirements in the present and near future for the production of quality photo hard copy with the highest information content possible from the video tape received from the collection community. 25X1

5. RECOMMENDATIONS:

In keeping with the Center's responsibility to lead the Intellignece Community in the exploitation of intellignece imagery, it is highly recommended that the [redacted] proposal for a "Magnetic Tape to Photo Reproducer" for [redacted] be accepted. 25X1 25X1

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Tab B

TECHNICAL SPECIFICATIONS FOR MAGNETIC TAPE TO PHOTO REPRODUCER

The primary considerations for the operation of the assembled equipment are as follows:

a. Photographic hard copy quality as compared to stored data quality.

The ultimate R&D objective is to provide a method for producing the highest possible quality photographic hard copy from video tape information provided by the collection community.

b. Electronic Enhancement.

Particular emphasis is placed upon the ability to examine (slow motion), study (stop motion) and select particular sequence, frames and/or fields* of video information. It is necessary to use the most advanced electronic techniques to optimize the image or particular parts of the image, i.e., a dark shadow.

In addition to brightness and contrast controls the equipment will have:

1. "Spot Wobble" - Control for reducing or eliminating the appearance of scan lines.

2. Verticle apperture Equalizing - verticle scan line enhancement.

* A single field would be used for optimum image information in the case of excessive motion of the particular subject of interest.

3. Horizontal aperture Equalizing - horizontal enhancement.

4. Gamma control or "black stretch" - shadow enhancement.

5. Exponential control or white stretch - highlight enhancement.

6. Dropout Compensator - circuitry for removing white streaks due to imperfections in the video tape.

c. Reliability, low maintenance, and ease of operation.

The basic components shall be of the highest commercial quality. Where possible, solid state components will be used. Particular efforts will be made to minimize RFI. Circuitry and shielding shall be designed and fabricated to keep the RFI of the interface components at least equal to or less than the basic commercial components of the assembly.

The man-machine interface shall be designed for ease of operation without over simplification to the point of sacrificing machine performance or special functions. Equipment should be designed to facilitate testing and maintenance of the components.

d. Ability to handle various standards.

The assembled equipment will be able to handle the following standards both high and low land.

1. 525/60

2. 525/50

3. 405/50

The equipment will be ammendable to modification without extensive changes, to color TV when the source becomes readily available.

(When Filled In)

R & D CATALOG FORM

DATE: 14 February 1967

1. PROJECT TITLE/CODE NAME: Magnetic Tape to Photo Reproducer

2. SHORT PROJECT DESCRIPTION: Assemble and/or develop equipment to extract high quality still photographs from various types of video tape inputs.

3. CONTRACTOR NAME: NA

4. LOCATION OF CONTRACTOR: NA

5. CLASS OF CONTRACTOR: Manufacturer

6. TYPE OF CONTRACT: NA

7. FUNDS: FY 19 $

8. REQUISITION NO.: NA

9. BUDGET PROJECT NO.:

FY 19 $

10. EFFECTIVE CONTRACT DATE *(Begin - end)*: NA

11. SECURITY CLASS.: 25X1

FY 19 $

12. RESPONSIBLE DIRECTORATE/OFFICE/PROJECT OFFICER TELEPHONE EXTENSION

DDI/NPIC/TDS, 25X1

13. REQUIREMENT/AUTHORITY

There is a current requirement to have the capability of viewing magnetic video tape at NPIC and to be able to extract high quality still photographs from various video tape inputs.

14. TYPE OF WORK TO BE DONE

This engineering development will be to assemble and modify off-the-shelf equipment to perform the desired functions.

15. CATEGORIES OF EFFORT

MAJOR CATEGORY	SUB-CATEGORIES
Special Techniques and Studies	Video
	Electronics
	Photography
	EM Radiation

16. END ITEM OR SERVICES FROM THIS CONTRACT/IMPROVEMENT OVER CURRENT SYSTEM, EQUIPMENT, ETC.

The final assembly will be equipment which will provide the NPIC with a capability it now lacks, i.e., to obtain high quality photographs from video tapes.

17. SUPPORTING OR RELATED CONTRACTS *(Agency & Other)*/COORDINATION

The security aspect of this system is being coordinated with the Security Branch; Support Staff, NPIC. Project will tie in with CCTV radiation problems. Project is being fully coordinated with CSD.

18. DESCRIPTION OF INTELLIGENCE REQUIREMENT AND DETAILED TECHNICAL DESCRIPTION OF PROJECT *(Continue on additional page if required)*

Although most video tapes supplied by the collection community can be viewed at some installation in the Washington area, there are no installations where the tapes can be studied and there is no way to produce high quality photographs of selected imagery.

As the leader in the field of photographic intelligence, NPIC should have the capability to view, study, and extract high quality photographs from any video tape input supplied by the collection community. This project is aimed at that goal

19. APPROVED BY AND DATE

OFFICE	DEPUTY DIRECTOR	DDCI

FORM 2228 SECRET GROUP 1

6 December 1965

MEMORANDUM FOR: Chief, CSD

THROUGH : Chief, Ref/CSD

SUBJECT : Video Tape Collection and Exploitation Programs

On Thursday, 2 December, I spent an hour with [redacted] of FBID in his office in the Key Building. [redacted] is an electronics engineer, and I was referred to him when I called [redacted] the chief engineer of FBID, whom I have dealt with before on the [redacted] Operation. [redacted] recently accompanied [redacted] Chief, Film Branch, OCR/GR, on a trip to FTD to discuss the "Blue Racer" Program.

[redacted] detailed the three existing FBID TV programs;

1. [redacted] This operation has had one significant change; FBID has built a new station, and has erected taller antennas. This has resulted in an estimated 200% better picture.
2. [redacted] This operation employs a locally purchased Phillips model 14TD TV receiver and a polaroid camera. The camera is electronically synchronized with the receiver to avoid photographing bar-lines.
3. [redacted] This operation employs a Sony model 5206 Micro TV and an electronically synchronized Robot Star 35mm camera.

The procedure in operations "2" and "3", is to have the proper radio broadcast monitor operate the camera, using his best judgement as to what is important. FBID receives no requirements from OCR/GR, but sends them all photos taken.

[redacted] was either unwilling or unable to go into FBID's future plans for new stations. He indicated that this subject is currently under discussion within FBID. I requested that I be advised if these discussions resulted in a proposal or plan. He agreed.

[redacted] however, did indicate that Bloc TV reception was possible in the following areas;

1.	Finland	USSR
2.	Austria	Czechoslovakia
		Hungary
		Yugoslavia
3.	Cyprus	Turkey
		Middle East
4.	Sakhalin Is.	USSR

SUBJECT : Video Tape Collection and Exploitation Programs

He also mentioned that FBID was considering portable systems that could be dispatched to one of these areas during a crisis.

[redacted] also provided some details about the various world TV systems: 25X1

1. US standard = 525 scanlines @ 60 cycles
2. UK standard = 405 scanlines @ 50 cycles
3. Eurovision = 625 scanlines @ 50 cycles
4. France = 819 and 625 scanlines @ 50 cycles
5. German standard = same as Eurovision
6. Intervision = 625 scanlines @ 50 cycles (However, differences in bandwidth and sync pulses)
7. Soviet standard = same as Intervision

[redacted] said that FBID's mission as expressed in its charter, overlapped the FTD "Blue Racer" program. FBID went along with "Blue Racer" as long as it was understood that it was still an FBID mission, and as long as full details on results were provided. These details have apparently not been forthcoming. 25X1

The Foreign Services Division (FSD) of FTD is in charge of "Blue Racer". The officer in charge of FSD is [redacted] The project engineer is [redacted] The program employs a MVR-15 suitcase-sized video tape recorder produced by [redacted] The machine costs about [redacted] and employs a 1" tape which is helically scanned. This permits stopping the frame, and the machine at FTD is so modified. In comparison to a 2" system, the 1" system sacrifices about a 25% in definition at both ends of the gray scale, because some of the bandwidth is lost. 25X1 25X1 25X1 25X1

FTD has three machines: one at Wright Patterson (modified for stop-frame), one at Frankfurt, and one in Moscow. Both the Frankfurt and Moscow machines have been modified to meet local conditions. The Moscow machine is operated and maintained by the Air Attache, who has intelligence experience, but of course no electronics competence - this has been one of the problems.

FTD has received authorization to purchase Amp ex-developed equipment which will convert 1" tape of any scan-line standard to 2" American standard. Neither FBID nor OCR/GR know FTD's dissemination plans when this service becomes available, or when it will be available.

SUBJECT : Video Tape Collection and Exploitation Programs

FBID is quite concerned about television. They have noticed, for instance, that on several occasions recently, important speeches have been broadcast over Moscow local TV only, and not over any other medium that FBID taps.

[redacted] was also in attendence at a recent NSA TV showing, and commented on it. 25X1

[redacted] 25X1